Fort Hood Links Digital Controls to One Interface

By Dana Finney

When Darrell Cimbanin takes a heating or cooling related trouble call, he has to pack up his laptop, drive to the customer's building, and plug into the control system to diagnose the problem. Then he either makes adjustments or goes back to supply for parts to repair whatever has gone wrong with the heating, ventilating, and air-conditioning (HVAC) system.

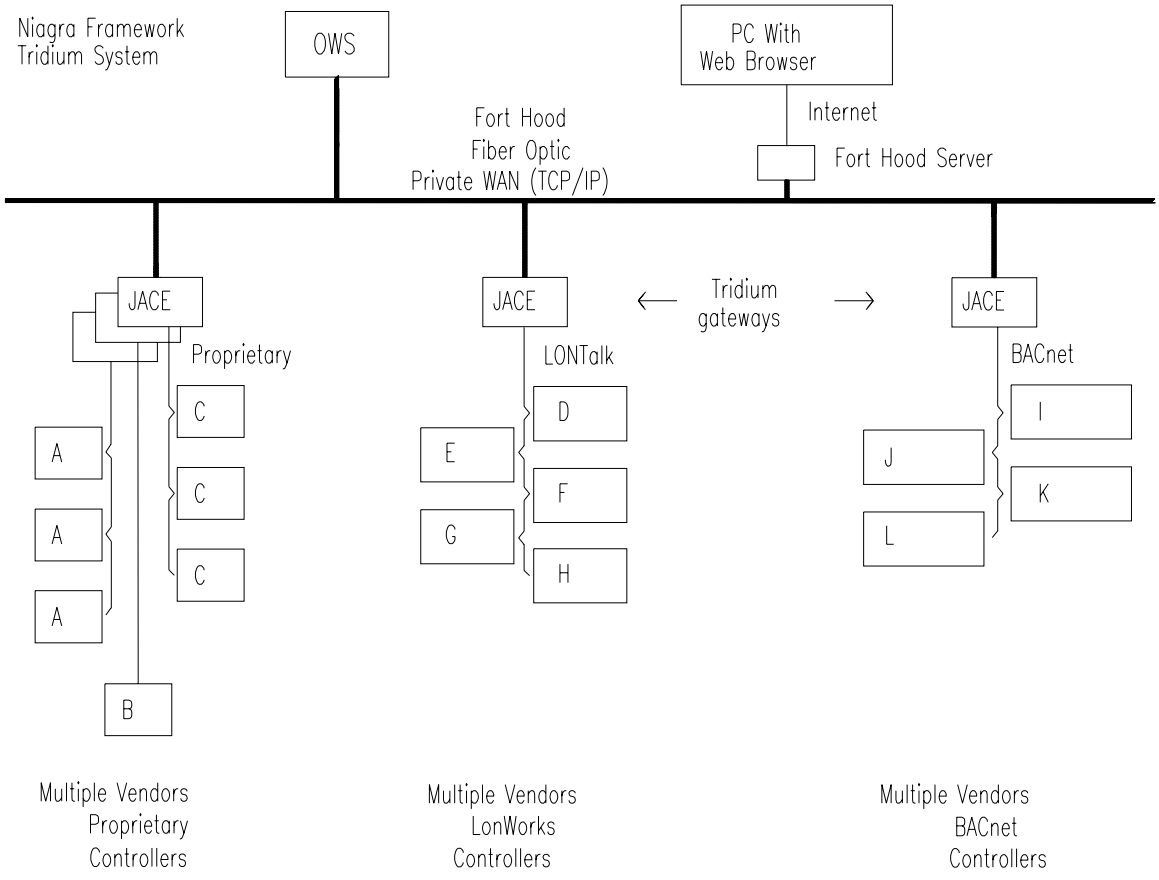
That's beginning to change as new tools to integrate Fort Hood's direct digital control (DDC) systems go online. The Engineer Research and Development Center's Construction Engineering Research Laboratory (CERL) is helping the DPW exploit sophisticated "open systems" computer technology that will allow different types of DDC units to "talk" to each other.

"The direction we've been trying to go for the past couple of years is toward a base-wide system that can talk to all your controls," said Cimbanin, {Controls Technician} in Fort Hood's DPW. "Having a single system will cut downtime, allow us to respond faster to our customers, and give us a way to perform troubleshooting remotely."

Fort Hood has over 5,000 buildings and many of them use DDC systems to control the HVAC equipment. Because of the government's competitive procurement process, over the years these systems have been purchased from many different manufacturers. "With very few exceptions, each DDC system uses the vendor's proprietary means of communicating its operating data," said David Schwenk, CERL researcher for the project. "That makes it very difficult to put energy management strategies in place and control HVAC equipment operations."

The controls at Fort Hood will be linked together using a product called Niagra Framework™ Tridium™. According to Richard Strohl, {Supervisor of the Controls Section} in the DPW, "This is basically a type of operating system that includes some special hardware and software. It allows DDC manufacturers to develop drivers that will translate their communication protocol into an 'open' or standard protocol."

The open language required for Fort Hood's building-level systems is LonTalk™. CERL is developing master plans that call for any future DDC purchases to be "LonMark Certified," said Schwenk. "As a transitional feature, the Tridium system supports other protocols including BACnet and about 75 different proprietary protocols. This helps Fort Hood to migrate from their legacy systems." (See diagram below.) This open communication feature has virtually limitless possibilities for tying together management systems on an installation. Anything from electric meters to wastewater discharge to detecting chlorine levels in swimming pools could be integrated into this open network.



The Corps of Engineers Fort Worth District has been instrumental in helping procure and put this system in place. The work at Fort Hood is part of a Military Construction, Army (MCA) project for a General Instruction Building (GIB). In effect a small college, initially all the GIB's controls systems will be integrated. After the MCA project is complete, Fort Hood plans to link existing controls on the post to the Tridium workstation. A recent meeting at the Fort Hood DPW with the Huntsville Engineering Support Center (Mandatory Center of Expertise for UMCS), CERL, Fort Worth District, the Fort Hood DOIM Office, served as a kickoff meeting for this multi-year open-systems integration effort.

In addition to having a central operator workstation, the system is web-based, with varying levels of access given users as needed. In some cases, building occupants will be able to control their temperature by logging on to the web. Passwords and permissions will be assigned to maintain system security. According to Cimbanin, the integrated platform provides a powerful tool for both maintenance and management.

"Now when we get trouble calls, we send people all over the post to make repairs," he said. "The Tridium workstation will let us immediately call up the DDC system at any building, find out what's going on -- for example, with the water temperature, chiller or boiler status, or so on -- and then potentially make

changes to correct it. Or I can call the mechanics and tell them what part to take out to the building for repairs."

As a management tool, Strohl said the system integration will make alarming, logging, trending, and reporting easier and more accurate. It will also enable better post-wide control over energy use. For example, when units deploy and only two or three living quarters are left occupied in a housing block, the DPW can turn off heat or cooling to all but those rooms being used.

With worldwide web access, users with proper passwords can access information about a building's HVAC system anywhere, 24 hours a day. That means Cimbanin can potentially fix a problem from his home without driving back to the post in the middle of the night. "I could be in Illinois and check the web to be certain that the CG's office is comfortable," he said.

HQ USACE will use lessons learned from Fort Hood's research project to update two Corps of Engineers Guide Specifications (CEGS) and a Technical Instruction (TI): CEGS-15951, Direct Digital Control for HVAC, CEGS-13801, Utility Control Systems, and TI 810-11, HVAC Control Systems.

For more information about integrated DDC systems or any HVAC-related question, contact David Schwenk at CERL, 800-USA-CERL, ext.7241, David.M.Schwenk@erdc.usace.army.mil.

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